

WHAT IS CLAIMED IS

1. An optimization method for power generation cost;
the method assuming the mixture rate of alternative
fuel and calculating the fuel cost for achieving a target
5 power generation output based on, at least, the fossil
fuel price, alternative fuel price, electric power price,
and CO₂ emission rights price for trading;

calculating the fuel cost in the case of using fossil
fuel only; and

10 determining the ratio of mixture of the alternative
fuel at which the fuel cost in the case of mixing the
alternative fuel is lower than the fuel cost in the case
of using the fossil fuel only.

2. The optimization method for power generation cost
15 as set forth in Claim 1, wherein the procedure of
assuming the mixture rate of the alternative fuel and
calculating the fuel cost:

forms the zero-order synthesis fuel invest plan that
specifies the initial mixture rate of the fossil fuel and
20 alternative fuel;

calculates the fuel cost based on the fossil fuel
price, alternative fuel price, electric power price, and
CO₂ emission rights price for trading;

judges whether the result of the fuel cost
25 calculation has reached the optimum cost; and,

if not yet reached, modifies the nth-order synthesis

fuel invest plan and forms the (n+1)th-order synthesis
fuel invest plan; and

re-inputs the plan into the calculating procedure;
and,

5 if the result has reached the optimum cost, outputs
an operating plan meeting the fuel cost.

3. The optimization method for power generation cost
as set forth in Claim 1 or 2, wherein the procedure of
assuming the mixture rate of the alternative fuel and
10 calculating the fuel cost calculates;

in the case of CO₂ emission rights purchase,

Fuel cost = Alternative fuel consumption × Unit for
alternative fuel +

15 Fossil fuel consumption × Unit for fossil
fuel +

Emission rights trading displacement ×
Unit for emission rights trading; and

in the case of CO₂ emission rights sale,

20 Fuel cost = Alternative fuel consumption × Unit for
alternative fuel + Fossil fuel

consumption ×
Unit for fossil fuel - Emission rights
trading displacement × Unit for emission
rights trading

25 4. An optimization system for power generation cost,
comprising:

a fuel price database for storing, at least, the fossil fuel price, alternative fuel price, electric power price, and CO₂ emission rights price for trading;

planning means for forming the zero-order synthesis
5 fuel invest plan that specifies the initial mixture rate of the fossil fuel and alternative fuel;

calculating means for calculating the fuel cost based on the prices such as fuel prices in the database; and

evaluation method for judging whether the result of
10 the fuel cost calculation has reached the optimum cost, and, if not yet reached, modifying the nth-order synthesis fuel invest plan, forming the (n+1)th-order synthesis fuel invest plan, and re-inputting the plan into the calculating means, and if the result has reached
15 the optimum cost, outputting an operating plan meeting the fuel cost.

5. The optimization system for power generation cost as set forth in Claim 4, wherein

the calculating means includes a means for
20 calculating;

in the case of CO₂ emission rights purchase,

Fuel cost = Alternative fuel consumption × Unit for alternative fuel

+ Fossil fuel consumption × Unit for fossil fuel

25 + Emission rights trading displacement × Unit for emission rights trading; and

in the case of CO₂ emission rights sale,

Fuel cost = Alternative fuel consumption × Unit for
alternative fuel

+ Fossil fuel consumption × Unit for fossil fuel

5 - Emission rights trading displacement × Unit for
emission rights trading

6. The optimization system for power generation cost
as set forth in Claim 4 or 5, wherein

10 the calculating means includes a means for
calculating, using, as A1, a variable that bases on the
change in the efficiency of a power generation plant
resulting from the invest of alternative fuel,

Fuel consumption = A1 × Alternative fuel consumption
+ Fossil fuel consumption

15 7. The optimization system for power generation cost
as set forth in any one of Claims 4 to 6, wherein

the calculating means includes a means for
calculating, using, as the basic fuel consumption, the
fossil fuel consumption in the case the fuel consumption
20 comprises 100% fossil fuel, and, as K2, a proportional
constant that depends upon the special characteristic of
a plant,

Basic emission amount = K2 × Basic fuel consumption;
calculating, using, as K3, a proportional constant
25 that depends upon the special characteristic of a plant,

Hazardous substance emission amount reduction = K3 ×

Alternative fuel consumption; and

calculating

Hazardous substance actual emission amount = Basic
emission amount - Emission amount reduction

5 8. The optimization system for power generation cost
as set forth in any one of Claims 4 to 7, wherein
the calculating means includes a means for
calculating,

10 using, as the emission rights share, the hazardous
substance emission amount that is permitted under the
distributed free-of-charge CO₂ emission rights, in the
case of "actual emission amount > emission rights
distribution share",

15 Emission rights purchase amount = (Actual emission
amount - Emission rights distribution share); and, in the
case of "actual emission amount ≤ emission rights share",

Emission rights purchase amount = 0

20 9. A support system for generating company,
comprising a fuel supply company who sells fossil fuel
and alternative fuel, transmission company who sells the
electric power that is generated using the fossil fuel
and alternative fuel, and fuel information management
company, wherein

25 the fuel information management company owns an
optimization system for power generation cost, comprising
a fuel price database for storing, at least, the fossil

fuel price, alternative fuel price, electric power price,
and CO₂ emission rights price for trading, received from
the fuel supply company, planning means for forming the
zero-order synthesis fuel invest plan that specifies the
5 initial mixture rate of the fossil fuel and alternative
fuel, calculating means for calculating the fuel cost
based on the prices such as fuel prices in the database;
and evaluation method for judging whether the result of
the fuel cost calculation has reached the optimum cost,
10 and, if not yet reached, modifying the nth-order
synthesis fuel invest plan, forming the (n+1)th-order
synthesis fuel invest plan, and re-inputting the plan
into the calculating means, and if the result has reached
the optimum cost, outputting an operating plan meeting
15 the fuel cost;

transfers the operating plan to the transmission
company, and orders the alternative fuel from the fuel
supply company in a volume necessary for the operation at
the mixture rate;

20 the fuel supply company delivers the ordered
alternative fuel to the transmission company; and

the transmission company generates electric power
according to the transferred operating plan, and pays a
merit charge for a fuel price curtailment, which is the
25 fuel cost reduction multiplied by a pre-specified
coefficient, to the fuel information management company.

10. The support system for generating company as set forth in Claim 9, wherein the optimization system for power generation cost owned by the fuel information management company comprises a fuel price database for storing, at least, the fossil fuel price, alternative fuel price, electric power price, and CO₂ emission rights price for trading, planning means for forming the zero-order synthesis fuel invest plan that specifies the initial mixture rate of the fossil fuel and alternative fuel, calculating means for calculating the fuel cost based on the prices such as fuel prices in the database; and evaluation method for judging whether the result of the fuel cost calculation has reached the optimum cost, and, if not yet reached, modifying the nth-order synthesis fuel invest plan, forming the (n+1)th-order synthesis fuel invest plan, and re-inputting the plan into the calculating means, and if the result has reached the optimum cost, outputting an operating plan meeting the fuel cost.

11. The support system for generating company as set forth in Claim 9 or 10, wherein

the optimization system for power generation cost includes a means for calculating, in the case of CO₂ emission rights purchase,

Fuel cost = Alternative fuel consumption × Unit for alternative fuel

+ Fossil fuel consumption × Unit for fossil fuel
+ Emission rights trading displacement × Unit for
emission rights trading; and

calculating, in the case of CO₂ emission rights sale,

5 Fuel cost = Alternative fuel consumption × Unit for
alternative fuel

+ Fossil fuel consumption × Unit for fossil fuel
- Emission rights trading displacement × Unit for
emission rights trading.